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Remarks

Claims 1 – 11 are pending in this action. Claims 1 – 11 stand rejected. Claims 1, 3, 5, 6, 8, 9, and 10 have been amended. Claim 11 has been canceled. Based on the following remarks, Applicants respectfully request reconsideration of all pending claims herein.

Applicant's have canceled Claim 11 on the grounds that it was considered new matter and objected to by the Examiner.

In regards to the certified copy of the priority documents, Applicants mailed a certified copy of Foreign Application, Japanese Application JP2003-038532, July 15, 2004 to the USPTO. Applicants' received a return receipt postcard on July 23, 2005 with an OIPE date stamp of July 19, 2004 indicating that the certified copy of the foreign application was received by the USPTO. Additionally, Applicant's would like to refer to the artifact sheet listed on the IFW: "artifact sheet indicating an item has been filed which cannot be scanned" dated 7-19-2005, which may be in reference to the foreign priority document, which was filed but could not be scanned into the system because it is a bound document.

Claim Rejections – 35 U.S.C. § 102 (b)

The Examiner has rejected claims 9 and 10 under 35 U.S.C. 102(b) as being anticipated by Hamada (U.S. Patent No. 6,906,282).

The Examiner states that Hamada discloses a hole drilling apparatus that includes a laser for drilling holes through a mask into a work piece, which is further attached to a movable stage. The mask has a processing pattern made from a plurality of holes. An imaging lens controls the direction of the laser on the work piece surface and ratios of the imaging lens determine the diameter of the holes.

Applicants submit that Hamada's apparatus uses an optical mask template with a predetermined pattern corresponding to the desired pattern of the holes to be drilled on the work

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piece, i.e. the mask is used as a template such that the resulting holes in the work piece directly correspond to the holes in the mask template (see Hamada; Col 1 Lines 38 – 45, Fig. 1 – 4, Claims 1 and 3). The location of holes on the work piece described in Applicants' invention is not controlled nor determined by a mask (see Maeda; Paragraph 31, Fig. 2). Applicants' invention uses a mask for controlling the diameter of the laser. Applicants have requested an amendment to claim 9 which further clarifies that the instant invention uses a mask for the purposes of controlling the laser diameter and not for positioning the holes.

Hamada discloses an apparatus wherein the diameter of the holes is adjusted by changing the reduction ratio of the imaging lens between the mask template and the work piece (see Hamada; Col 1 Lines 42 – 45, Fig. 1). In Applicant's invention, the diameter of the holes is adjusted by changing the diameter of the laser, which is accomplished by cooperation of the collimeter lens CL and optical mask 15 through which the laser passes (see Maeda; Paragraph 31, Fig. 2, and Claim 9). Applicants further submit that the instant invention apparatus is fundamentally different from the apparatus disclosed by Hamada because Hamada does not exploit the refractive properties of a lens to create an angled hole in a work piece. (see Maeda: Figures 2, 3a-b, and 7, Paragraphs 34, 48, amended Claims 9 and 10).

Finally, the apparatus described by Hamada uses a laser beam that is wider than the diameter of the hole to be drilled (see Hamada Fig. 2-3, Col. 1 lines 23-36). Applicants invention requires a laser beam that is the exact diameter of the hole to be drilled or smaller (see Maeda, Fig. 4a-4c and 6, amended claim 9).

Applicants respectfully submit that the arguments described above and the proposed amendments to Claims 9 and 10 overcome the Examiner's rejections and that Applicants' invention is patentably distinguished from the reference cited by the Examiner. Accordingly, Applicants respectfully submit that the rejection of claims 9 and 10 under 35 U.S.C. § 102(b) has

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been overcome and claims 9 and 10 are in condition for allowance.

Claim Rejections - 35 U.S.C. § 103(a)

The Examiner rejected claims 1 - 8 under 35 U.S.C. § 103(a), as being unpatentable over U.S. Patent No. 6,649,864 issued to De Steur et al. in view of U.S. Patent No. 4,822,974 issued to Leighton.

The Examiner stated that De Steur discloses a laser drilling method in which a perforated mask is used to drill a hole with a predetermined diameter. The Examiner stated that Leighton discloses a laser drilling apparatus wherein the laser angle incident on the work piece is determined by the position of two prisms through which the laser travels. The Examiner stated that it would have been obvious to one skilled in the art to determine the angle of the beam relative to the axis as taught by Leighton in the De Steur process.

Applicants respectfully submit that De Steur teaches away from having angles incident to the work piece because the De Steur process articulates the laser beam in a circular motion to "circle punch" the hole (See De Steur Col. 3 Line 45 – Col. 4 Line 10, Figures 3 -4). De Steur teaches moving the beam within the perforated mask template (which is affixed to the work piece) in complete concentric circles until the entire circular area of the hole corresponding to the mask opening has been removed and the result is a cylindrical hole (see De Steur: Abstract, Summary of the invention, Figures, Independent Claims 1, 3, 16 – 18). De Steur teaches that a laser used in a circular motion through a perforated mask must be perpendicular to the work piece in order to create a rectangular hole because any angle incident on the work piece would create a conical or bi-conical hole and not a cylindrical hole. Therefore De Steur teaches away from Applicants' invention which discloses a method to form a straight hole using an angled beam alone or in conjunction with a perpendicular beam (See Maeda Fig. 1, 3b, and 7, amended Claims 1, 3, and 6).

Applicants respectfully submit that Leighton discloses a method and apparatus for drilling cylindrical, conical and bi-conical holes. Leighton teaches use of a laser beam that is perpendicular

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to the work piece to cut a cylindrical hole (see Leighton; Fig. 3, Col. 3 Lines 38 – 53, Claim 4). Leighton further teaches that using a beam which is at an angle with respect to the work piece creates a conical or bi-conical hole, and not a straight hole (See Leighton; Col.3 Lines 53 – 58, Col. 4 Lines 61-65, Claim 6).

Leighton further teaches an apparatus having the ability to move laterally and rotationally with respect to an axis in order to change the focal point of the laser beam on the lens to produce varied angles incident to the work piece (see Leighton Fig. 2 elements 115, 115', 115'', 114, 114', 114'', Fig. 3, Col. 4 lines 29 - 61). Applicants' apparatus is fundamentally different because it does not change the angle of the beam by changing the distance between the laser apparatus and the condenser lens. Applicants' apparatus includes a movable lens (not taught by Leighton) for changing the angle of the beam as it passes through the lens (see Maeda fig. 7, and amended claim 10), or changing the angle of the mirrors such that the focal point of the laser beam passes through a different area of the lens (see Maeda Fig. 2 and 3b, amended Claims 1,3, 5-6, and 8), thus changing the angle incident to the work piece. Leighton does not teach positioning the laser at different positions on the lens to change the angle incident to the work piece (see Leighton Fig. 1-3, Col.3 lines 53-58, Col.4 lines 61-65).

Since both De Stcur and Leighton teach the use of a perpendicular beam to produce a cylindrical hole, it would not have been obvious to one of ordinary skill in the art at the time of the invention to use an angled beam, either by itself, or in combination with a perpendicular beam to produce a cylindrical hole.

Applicants respectfully submit that the arguments described above and the amendments to Claims 1, 3, 5-6, and 8, overcome the Examiner's rejections and that Applicants' invention is patentably distinguished from the references cited by the Examiner. Claim 2 depends on claim 1 as amended; claim 4 depends on claim 3 as amended; and claim 7 depends from claim 6 as amended. Accordingly, Applicants respectfully submit that the rejection of claims 1 – 8 under 35 U.S.C. § 103(a) has been overcome and the amended claims 1-8 are in condition for allowance.

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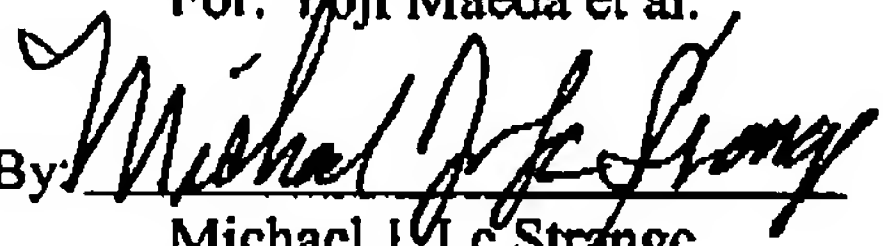
Summary and Conclusion

Based on the foregoing, it is respectfully submitted that the pending claims in the subject patent application are in condition for allowance and that the application may be passed to issuance.

The Examiner is urged to call the undersigned at the number listed below if, in the Examiner's opinion, such a phone conference would aid in furthering the prosecution of this application.

Respectfully submitted,

For: Yoji Maeda et al.

By: 

Michael J. Le Strange

Registration No. 53,207

Telephone No.: (802) 769-1375

Fax No.: (802) 769-8938

EMAIL: lestrang@us.ibm.com

International Business Machines Corporation
Intellectual Property Law - Mail 972E
1000 River Road
Essex Junction, VT 05452